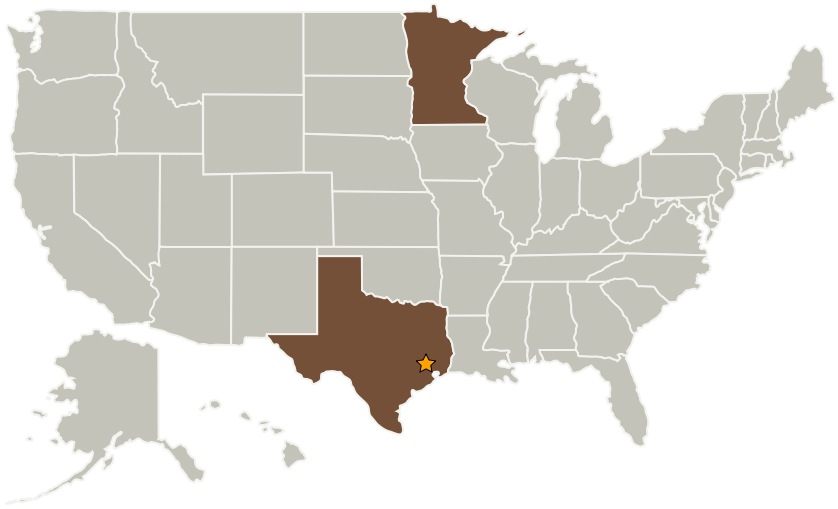
Biodegradable Long Shelf Life Food Packaging Material, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Long shelf life food packaging is a critical to maintaining the crew's well being in NASA's manned missions to the mars. Not only does the packaging have to offer an effective means to preserve the food's nutrition and flavor over a long period of time, but the packaging material itself should be easily managed/recycled inside a confined environment like a space shuttle. Although metal cans have long been used for long term food storage in daily life, trash management poses a serious problem for NASA. Recently, biodegradable polymers attracted a lot of attention as an environmentally friendly packaging material. However, they are mainly used for short shelf life products because of poor barrier properties. To enhance its barrier protection properties to oxygen and water, in this SBIR project, we propose a new composite material of PLA coated with a thin layer of transparent and pin-hole free amorphous Al2O3. To improve PLA thermal properties and produce retorted polymer structures nanoparticles will be introduced in the polymer matrix. Moreover, to obtain the desired barrier properties for long shelf life food packaging a unique technique will be used to deposit Al2O3 films at substrate temperatures less than 80□C. This effort will greatly enhance PLA's barrier properties to provide a unique high barrier packaging material with less mass and, more importantly, totally biodegradable. This technology is easily scalable and a successful commercialization will definitely benefit NASA's manned missions. Moreover, as an environmentally friendly packaging material, the technology has the potential to have a broad impact on society.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
SVT Associates	Supporting Organization	Industry	Eden Prairie, Minnesota

Primary U.S. Work Locations	
Minnesota	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines